



The current status of knowledge of herbal medicine and medicinal plants in Fiche, Ethiopia

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The current status of knowledge of herbal medicine and medicinal plants in Fiche, Ethiopia

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Abstract

Background: A majority of Ethiopians rely on traditional medicine as their primary form of health care, yet they are in danger of losing both their knowledge and the plants they have used as medicines for millennia. This study, conducted in the rural town of Fiche in Ethiopia, was undertaken with the support of Southern Cross University (SCU) Australia, Addis Ababa University (AAU) Ethiopia, and the Ethiopian Institute of Biodiversity (EIB), Ethiopia. The aim of this study, which included an ethnobotanical survey, was to explore the maintenance of tradition in the passing on of knowledge, the current level of knowledge about medicinal herbs and whether there is awareness and concern about the potential loss of both herbal knowledge and access to traditional medicinal plants.

Methods: This study was conducted using an oral history framework with focus groups, unstructured and semi-structured interviews, field-walk/discussion sessions, and a market survey. Fifteen people were selected via purposeful and snowball sampling. Analysis was undertaken using a grounded theory methodology.

Results: Fourteen lay community members and one professional herbalist provided information about 73 medicinal plants used locally. An ethnobotanical survey was performed and voucher specimens of 53 of the plants, representing 33 families, were collected and deposited at the EIB Herbarium. The community members are knowledgeable about recognition of medicinal plants and their usage to treat common ailments, and they continue to use herbs to treat sickness as they have in the past. A willingness to share knowledge was demonstrated by both the professional herbalist and lay informants. Participants are aware of the threat to the continued existence of the plants and the knowledge about their use, and showed willingness to take steps to address the situation.

Conclusion: There is urgent need to document the valuable knowledge of medicinal herbs in Ethiopia. Ethnobotanical studies are imperative, and concomitant sustainable programmes that support the sustainability of herbal medicine traditions may be considered as a way to collect and disseminate information thereby supporting communities in their efforts to maintain their heritage. This study contributes to the documentation of the status of current traditional herbal knowledge in Ethiopia.

Keywords: Ethiopia, Herbal medicine, Traditional medicine, Ethnobotany

Background

Ethiopia has been described as one of the most unusual and important sources of biodiversity in the world [1], yet is perilously close to losing much of this rich diversity due to deforestation, land degradation, lack of documentation of species in some areas as well as of traditional cultural knowledge, and potential acculturation [2-5]. Intertwined with the irretrievable loss of important species

of animals and plants is the risk of loss of traditional herbal medicine knowledge.

An estimated 80 to 90 per cent of Ethiopians use herbal medicine as a primary form of health care [6-9]. Despite significant recent improvements in modern health care, many rural communities continue to have limited access to modern health care due to availability and affordability [10,11]. It is widely acknowledged that the wisdom of both professional and lay healers in applying traditional medicine to support health and manage illness may be lost to future generations unless urgent efforts

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are made to document and disseminate the knowledge [3,4,7,12,13] and to engage the younger generation who may no longer be interested in learning the traditional methods [4,7,14]. Therefore Ethiopians, particularly those in rural areas, face an uncertain future in regard to ready access to affordable modern medical services and access to their traditional remedies.

Tradition

Herbalism is one aspect of traditional medicine practice in Ethiopia as it is in many other countries [15]. Herbs have traditionally been used in the home to treat family sickness, and occasionally traditional healers may be consulted. Traditional healers may be from the religious traditions of Cushitic Medicine, regional Arabic-Islamic medical system, or the Semitic Coptic medical system practiced by Orthodox Christian traditional healers [3], who are also referred to in Amharic as *debteras*. There may be many variations in approach within each system [16]. Spiritual methods are often used in combination with herbal applications particularly by the *debteras*, and the knowledge is traditionally passed down through the male line. When it comes to household herbal knowledge in the lay sphere, it is also generally considered that knowledge, in accordance with tradition, is preferentially passed on to a favourite child, usually a son [3,12,17,18], although a 2003 study by Gedif and Hahn [17] into the use of herbs for self-care, which primarily interviewed mothers, acknowledged mothers as the "de facto healers of the family treating accidents and ailments with medicinal plants".

Significance of the study

This study examined whether (i) knowledge was transferred to the current generation of lay community members in Fiche, (ii) lay people are knowledgeable about the medicinal use of herbs, (iii) lay people continue to practice herbal medicine in the treatment of sickness within the home. An aim of the study was also to determine whether or not there is enthusiasm for the preservation of knowledge and skills for future generations. The ethnobotanical survey that constituted part of this research helped to identify the plants used by local community members, for future planting in their household and community gardens. To our knowledge, no ethnobotanical exploration had previously been conducted in this area (personal communication, TA). The information gained from this study may inform further studies and projects aimed at documenting herbal knowledge in communities and supporting continued practice and sustainability of traditional herbal medicine in Ethiopia and elsewhere.

Materials and methods

This case study was conducted using an oral history method, a technique for historical documentation which

mirrors the cultural practice of passing on knowledge as an oral tradition, and encourages the subjects to present their experience of a specific event or period in the past [19]. It is a process of narrative building and within that framework the story of domestic life emerges. This gives contextual background to the information. A thematic analysis was applied to all interviews.

Ethics

Official collaboration with, and permission from, the Ethiopian Institute of Biodiversity and Addis Ababa University to conduct research ensured that the collection of local medicinal knowledge was compliant with current Ethiopian regulations relating to Access and Benefit Sharing. Ethics approval (No. ECN-10-24) from the Human Research Ethics Committee of Southern Cross University was granted, and verbal permission was sought from and granted by each informant, with full explanation given in the local language as to the purpose of the research. Permissions were recorded on film.

Participants

The focus of the case study was the town of Fiche, in the North Shewa Zone of Oromia Region, Ethiopia. Fiche is located 115 km north of Addis Ababa, 9°48'N and 38°44'E, at an elevation of 2700 metres above sea level, with a town population in 2007 of 27,493 [20] (Figure 1).

Fieldwork was conducted in January and February 2011. Six informants were initially recruited via purposeful sampling by a tertiary-educated, local representative who is knowledgeable about local herbs (referred to herein as 'M8') and who is planning a herbal garden at Fiche (called "Doyu-Armon"). M8 speaks English and provided some translation. The criterion for the sampling was being known in the community to have knowledge of medicinal plants and their use to treat ailments. Further informants were recruited thereafter by snowball sampling. The 15 informants consisted of 14 community members (8 males and 6 females) and a professional herbalist (male) of the Ethiopian Orthodox Christian tradition. In addition to the professional herbalist, three of the males and two of the females were considered by the community to be particularly skilled in herbal knowledge. Informants were aged between 39 and 70, with an average age of mid-forties. Informants are referred to as Male (M) or Female (F) and assigned a number.

Informants' education levels varied from illiterate (80% of informants), to secondary school education completed (10% of informants), with one tertiary-educated informant (M8, who initiated the recruitment of informants and provided some translation) and they belonged to either the Amhara or Oromo ethnic groups. All spoke Amharic and one (M8) was also fluent in English. In addition

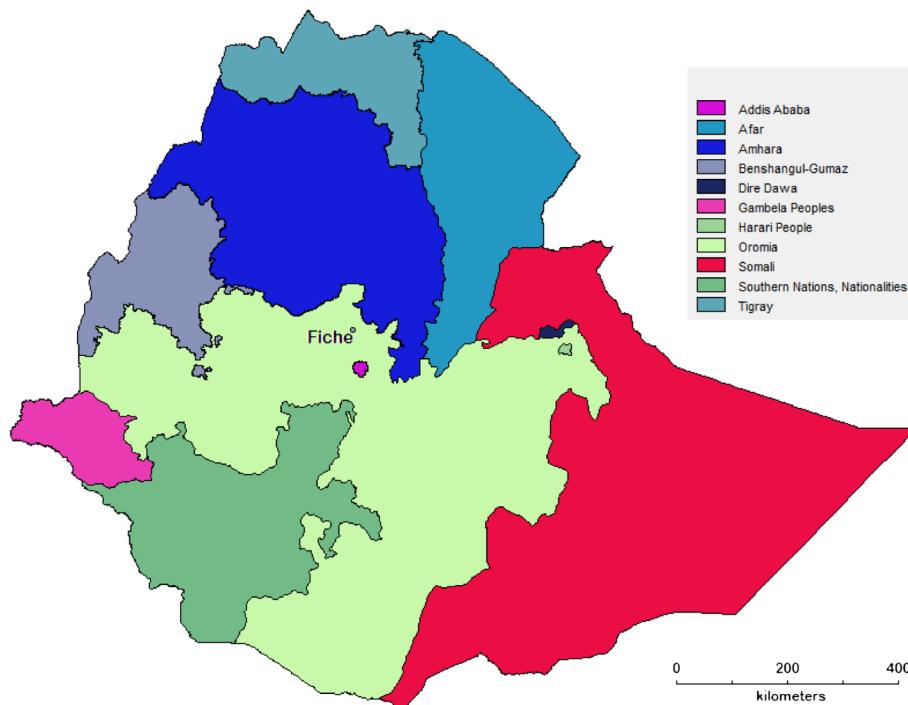


Figure 1 Map of Ethiopia showing Fiche.

to the informants, some incidental data was contributed by one of the authors (TA of the Ethiopian Institute of Biodiversity) in his capacity as translator and collector of voucher specimens.

The first informants recruited (2 women and 4 men including the professional herbalist) were identified by the local representative (M8) as persons with significant relevant knowledge, and subsequent informants were recruited by snowball sampling. This sampling method was effective and convenient as it utilised local knowledge to identify appropriate informants.

The first focus group (FG1, six people) provided an introduction of the lead researcher to the community and established the reasons for her presence. Following this session, more people came forward, interested in being part of the process. The professional herbalist was considered a respected Elder and his encouragement to the group was evident. The field-walk/discussion sessions were conducted in two household gardens and the escarpment (open pasture) above the River Jemma Gorge. The market survey was conducted at the Saturday market in Fiche, and the information was obtained from the vendors of the herbs who were mainly women.

Data collection

Field data were collected on six days during January and February 2011. A combination of focus groups (3), individual interviews (5), field-walk/discussion sessions (4) and one local market survey were conducted, with a

tertiary-educated translator present at each session. Interview sites, all of which were in Fiche, were: Household garden (HG), homes of community members (H1 and H2), Doyu-Armon garden site (site for planned garden) (D-A), Escarpment above River Jemma Gorge (E) and Fiche Saturday market (M). The Jemma River is a tributary of the Blue Nile. Table 1 shows the timetable of fieldwork.

Additional file 1 shows a plant collection site on the escarpment above River Jemma, as well as extracts of interviews.

The plant specimens collected by the Ethnobotanist (author TA) with the assistance of the informants were pressed, dried and identified following standard procedure and lodged at the EIB Herbarium in Addis Ababa. Translation was provided by TA and M8. All interview and focus group session translations were transcribed directly onto computer by the lead researcher, and all sessions were filmed, with the permission of participants. Later viewing of film footage provided useful review of data. In this way visual dynamics between informants could be viewed and further nuance from discussion picked up without the distraction of the recording process. Footage of 2 focus groups was viewed by a second translator to check areas where translation was indistinct, ambivalent, or not understood by the principal researcher. Other discussions, researcher observations and comments were recorded by hand into a notebook at the time, and a daily journal of all activities, with

Table 1 Timetable of fieldwork

Present:	Session	Where	Duration
F1, M1, M8, R	Field-walk 1 (W1)	HG	1 hour
F1, M1, M3, M4, PH, M8, R	Focus group 1 (FG1)	H2	2 hours
PH, M8, R	Individual interview 1 (I1)	H2	1 hour
F1, E, M8, R	Field-walk 2 (W2)	HG	1 hour
	Collection of voucher specimens		
F1, E, M8, R	Field-walk 3 (W3)	HG	1 hour
	Collection of voucher specimens		
F6, E, M8, R	Individual interview 2/field-walk (I2) + voucher specimen collection from Doyu-Armon garden site	Next to D-A on pasture	½ hour
Female stallholders, E, R	Market survey (M)	M	1 hour
F4, F5, M8, R	Individual interviews 3 + 4 (I3)	H2	1 hour
M1, M2, M3, M5, M7, M8, F1, F4, F5, E, R	Focus group 2 (FG2)	H2	3 hours
M6, M8	Individual interview 5 (I5)	H1	20 minutes
M1, M3, M5, M7, M8, E, R	Field-walk 4 (W4)	E	2 hours
	Collection of voucher specimens		
F1, F2, F3, M1, M3, M5, M7, M8, E, R	Focus group 3 (FG3)	H	2 hours

Codes: F = Female, M = Male, PH = Professional Herbalist, E = Ethnobotanist (TA), R = Researcher (Ed'A), HG = Household garden, H1 and H2 = homes of householders, E = Escarpment above River Jemma.

observations, comments and reflections, was written at the end of each day.

Interviews and focus groups were semi-structured. In an effort to ensure the women and men contributed equally during the mixed focus group discussions, an opening question ("How did you learn?") was directed to each person individually. In this way, informants were able to provide in-depth answers in an individual manner as well as collectively. Occasional prompting, especially on the field-walk activities, would include the questions "What do you use this herb for?" How do you use this herb?" and "What do you call this herb?" allowing uninterrupted flow of discussion unless it strayed significantly from the topic, in which case an appropriate question was asked. Some contextual information was given by the free discussion in this way, often providing additional (unprompted) cultural background.

Data analysis

Grounded theory was applied as a method to conceptualise the data and identify themes. Grounded theory is a method which allows themes to emerge through analysis of data and may provide further deep, thick context to a theory by exposing underlying processes [21]. In keeping with this approach to interpretive analysis, transcripts from each interview were analysed repeatedly to identify emerging themes, and concept codes were assigned (open coding). Coding formed the basis for categories, and the data were examined within categories. Seven category headings were identified and under these all the data were accounted for. Data were examined for herb names, for

disease names, and for formulas or prescriptions, and a quantitative list constructed. The existing literature was examined for documented uses in Ethiopia of the herbs mentioned and included in this list as a commentary.

Results and discussion

Given that the research was conducted in a language and culture different from that of the principal researcher, some discussion of method with this aspect in mind is pertinent.

The intensive biography interview style of data collection associated with the oral history method allows a researcher to learn about informants' lives from their own perspective [22]. The open discussion of memories, within the context of talking about herbs given to an informant as a child, gave the researcher the opportunity to observe and learn about informants within the context of their home life. Traditional medicine studies undertaken in Ethiopia are not often conducted in this way, with the perspective of an outsider exploring the current situation of the threat of loss of an important tradition, keeping cultural context at the forefront. Whilst being an outsider may on the one hand be seen as a limitation, on the other hand the researcher's presence and interest in their plight highlighted outside interest and gave the community a sense that others considered their knowledge important and of value. The potentially negative issue of being an 'outsider' was ameliorated by the facts that the principal researcher is a herbalist in her own country, is able to speak a little of the language, was introduced to the community by a trusted member of that

community and had previously visited Ethiopia (although not this area) on several occasions. The initiation of a programme to support establishment of a medicinal herb garden in the area (Botanica Ethiopia, see Additional file 2), also demonstrated tangible ongoing support to the community beyond the research programme.

According to Bryman [19], oral history testimonies have provided a method for the voices of the marginalised to be heard. It is not just people who may be marginalised, but also cultural traditions. In respect to the community group in Fiche, important cultural traditions and associated knowledge may be marginalised because community members may not have a strong voice in determining the future of those traditions. Further, the female members of this community may find their knowledge marginalised because despite the acknowledgement that women practice herbal medicine in the home [17,23], the prevalent belief [3,12,17,18] is that men (both professional traditional healers and in the family) are the prime holders of the knowledge. Time constraints of daily household chores may further restrict women's participation in both receiving and passing on knowledge, and having that knowledge may not receive the importance it deserves [9].

The grounded theory approach to analysis was helpful, especially given the particular complexities associated with this study *viz.* the principal researcher was collecting data while immersed in a language, culture and environment different from her own. Repetition of certain words (translated) provided an opportunity to identify themes. For instance, the word "learnt" appeared at least once per person interviewed in describing different events, not surprising given the question asked but this provided a focus for analysis on first pass. In association with the words "learnt" or "remembered" would be a reference to a family member or influential person. The word "childhood" appeared frequently in this context. Another theme that emerged related to accessibility, availability and sustainability of herbs with subcodes referring to "disappeared", "inaccessible", "not available", "hard to find". Once emergent themes were identified, data were fragmented to lift coded elements out of the context of each interview [24] to list comments and information by group. Fragmented data were then reconnected and reviewed within the context of each interview. Throughout data collection, the researcher was critically aware that words emerged via translation and might have been influenced by translator bias. Mindful of this, the researcher would at times repeat the answer and ask for it to be translated back to the informants for verification. Table 2 lists the themes that emerged from coding.

Fourteen lay community members (6 females and 8 males) and one professional herbalist provided information about 73 medicinal plants from 42 families. Voucher

Table 2 Themes Subthemes that emerged via the coding process were clustered into major themes

Theme	Subtheme
How knowledge is acquired from previous generation	People learnt from parents or other elders in the oral tradition People learnt from the treatment of their own illnesses as children
Awareness of loss of herbs	Now some herbs are difficult to access Some herbs are disappearing There is degradation of land Need to make effort to grow the herbs in household gardens
Conservation of herbs	Herbs need to be taken care of in the wild Wildcrafting is endangering some species
Passing on knowledge	Children may not be interested in learning about the herbs It is important to share the knowledge to save the herbs
Safety and dosage	Some herbs are toxic Some herbs are dangerous if combined Some herbs are dangerous if the dosage is too high Dosages adjusted for children
Gender	Women in general know more about application than men It is mostly women who sell the herbs in the marketplace Women have less time
Herb usage	Herbs are used in the home to treat family members for a range of illnesses or conditions Herbs are important Herbs are easily identified Herbs are sold in the market place

specimens of 53 of these, representing 33 families, were collected and deposited at the Herbarium of the EIB in Addis Ababa. The families contributing the most taxa were Asteraceae (6), Solanaceae (6), Lamiaceae (5) and Fabaceae (5). The major classes of indications cited by informants were gastrointestinal complaints (25 plants) including *megagna* (12), tapeworm infection (8) and hepatitis (5); psychiatric conditions (7) and respiratory complaints (5).

All herbs named, their uses, and a comparison with uses elsewhere in the literature, are shown in Table 3.

Each informant contributed information about the herbs with which they were particularly familiar. Because discussions were allowed to flow in an unstructured way, this did not lead to a fidelity rating for all the herbs as agreement was not specifically sought from each informant on any one herb and no prompts were given. The two occasions where there was significant consensus on

Table 3 Herb data chart

Botanical and family name [25]	Local name (Amharic)	Voucher no.	Use	Preparation	Informant (code)	Quotes and observations	Literature
<i>Achyranthes aspera</i> L. Amaranthaceae	<i>Telenj/qay telenj</i>	1933	Part of a recipe for <i>shotelay</i> (Rhesus factor incompatibility in pregnancy) combined with <i>Serabizu</i> (<i>Thalictrum rhynchosporum</i>), <i>Qeqchine</i> (<i>Indigofera zavattarii</i>), <i>Yimdu</i> <i>embway</i> (<i>Cucumis ficifolius</i>), <i>Tefrido</i> (<i>Gomphocarpus purpurascens</i>), <i>Tult</i> (<i>Rumex nepalensis</i>)	The herbs are dried, chopped together and put in a cotton pouch to be hung around the pregnant woman's neck in the seventh month. When the baby is born it is taken off the mother and put on the baby	M3	"To be collected on a Wednesday or a Friday, having abstained from sexual relations, and having not spoken to anybody on the morning of the collecting day. The herbs are dried outside the house, chopped together and put in a cotton pouch. The cotton must be spun by a lady in menopause, and spun with her left hand not her right hand. The pouch is put on the lady's neck and as soon as she gives birth it is taken from her and put on the baby's neck...this is my specialty"	Anti-fertility [26] Fresh pulverised leaf or its juice is placed in the nostril or its juice is sniffed for epistaxis. The crushed fresh leaf is also placed in the genitalia as a remedy for menorrhagia and to stop post-partum haemorrhage [27] Herpes zoster, blood clotting[28] Wound [29] Wound [30] Vaginal fumigation [31]
			Wounds (<i>kusil</i>)	Leaves rubbed and put on cut or wound	F1		
<i>Acokanthera schimperi</i> (A.DC.) Schweinf. Apocynaceae	Mrenz	2016	Psychiatric disease (<i>likuft</i>)	Used in a formula (see <i>Solanum incanum</i>)	F3		Antiarrhythmic, vasoconstrictor, hypertensive agent, Na/K ATPase inhibitor [32]
<i>Actiniopteris semiflabellata</i> Pic.Serm Pteridaceae	Menna		Burn (severe)	Powdered roasted plant applied topically	M2	"It was immediately cured by a <i>shamagalay</i> (old man) around the church. The doctor's treatment had not worked. I asked the <i>shamagalay</i> why this worked better than the clinic treatment. He said it was to contain the wound so that it did not affect the bone"	

Table 3 Herb data chart (Continued)

<i>Albizia anthelmintica</i> Brongn. Fabaceae	Musena	Taeniasis	<i>Musena</i> and <i>Enkoko</i> (<i>Embelia schimperi</i>) given but not in combination The bark is mixed with <i>Nug</i> (<i>Guizotia abyssinica</i>) and sugar The bark is mixed with <i>Nug</i> (<i>Guizotia abyssinica</i>), chopped together	M7 M5 F2 F1, F4	Drink either with <i>tella</i> (local beer) "If you take <i>musena</i> you may never see the segments...it kills all internally, it is digested. There will not be another infection" "We buy the <i>Musena</i> from the market"	Bark powder is cooked with meat and soup is taken as tenifuge [33]
<i>Allium cepa</i> L. Amaryllidaceae	Shinkurt	Taeniasis	As part of a formula comprising Arake (spirit brewed with fermented grains) with <i>Kosso</i> (<i>Hagenia abyssinica</i>), <i>Tenadam</i> (<i>Ruta chaleensis</i>), <i>Zingibil</i> (<i>Zingiber officinale</i>) and <i>Quorofa</i> (<i>Cinnamomum verum</i>)	F2	The herbs are used in the brewing of Arake	Widely used as a medicinal plant worldwide For common cold, malaria, cough, lung TB...asthma...parasitic infections, diarrhoea (etc.) [34] Widely used as a medicinal plant worldwide
<i>Allium sativum</i> L. Amaryllidaceae	Nech shinkurt	Asthma	3-4 cloves chopped and mixed with honey, dissolved by <i>Kosso arake</i> (spirit brewed with fermented grains and <i>Hagenia abyssinica</i>)	F2	"The <i>Kosso arake</i> dissolves the <i>Nech shinkurt</i> . The <i>Nech shinkurt</i> can have a kind of side effect on the stomach (gastritis). If you want to protect yourself you may take lightly roasted <i>Talba</i> (<i>Linum usitatissimum</i>) or <i>Abish</i> (<i>Trigonella foenum-graecum</i>)"	
<i>Aloe debrana</i> Christian Xanthorrhoeaceae		Wounds (<i>kusil</i>)		M1	"A wound that is infected and very dry, contracted, they will use <i>Aloe debrana</i> and it will relax"	

Table 3 Herb data chart (Continued)

<i>Aloe pulcherrima</i> M.G. Gilbert & Sebsebe Xanthorrhoeaceae	<i>Sete eret</i>	2000	Asthma	The sap is boiled with water. Sugar is added. This is filtered to about ½ teacup. Drink this and suck on a lemon. Do this for four days.	M6	"You will burp the lemon taste, not the bitter aloe taste. After using this recipe I am free from asthma"	"The species grows...in Gonder, Gojam, Welo and Shewa floristic regions. It is so far not known anywhere else. It occurs in a very sporadic manner, mainly on cliffs, and almost always in inaccessible places" [35]
<i>Aloe</i> spp. Xanthorrhoeaceae	<i>Eret</i>		Burn	The burn is washed first with warm water and salt, then <i>Eret</i> placed on top	F1	"We do not use alcohol to wash it like the doctors do"	
<i>Andrachne aspera</i> Spreng. Phyllanthaceae	<i>Tekeze</i>		Unexplained stomach ache (<i>megagna</i>)	The root is chewed for stomach treatment and nausea (anti-emetic)	M1, F1	"Not during pregnancy"	Ascariasis, stomach distention, malaria, asthma, gastritis, liver disease and as anti-emetic [36]
			Snake bite	The root is chewed, followed by lots of water. Will cause to vomit	F1		
<i>Artemisia absinthium</i> L. Asteraceae	<i>Ariti</i>	2024	Unexplained stomach ache (<i>megagna</i>)	Mixed with <i>Tej sar</i> (<i>Cymbopogon citratus</i>) and made into an infusion and filtered, and drunk	F4	"Ariti tastes bitter, like <i>Kosso</i> " (<i>Hagenia abyssinica</i>)	The juice of the powdered leaves is taken with honey to treat stomach ache [37]
				Mixed with <i>Tenadam</i> (<i>Ruta chalepensis</i>), and <i>Zingibil</i> (<i>Zingiber officinale</i>) made into an infusion, filtered and drunk	M3	Remembers <i>megagna</i> as a childhood illness. "The pain immediately disappeared when this mixture was drunk"	Cholagogic, digestive, appetite-stimulating, wound-healing, anticancer, antiparasitic [38]
						Found on sale in Fiche market, as part of a fragrant bouquet (with <i>Tej sar</i> – <i>Cymbopogon citratus</i> , <i>Ujuban</i> – <i>Ocimum basilicum</i> var. <i>thrysiflorum</i> , and <i>Tenadam</i> – <i>Ruta chalepensis</i>)	

Table 3 Herb data chart (Continued)

<i>Artemisia abyssinica</i> Sch.	Chikugn	1999	Evil Eye, combined with <i>Tenadam (Ruta chaleensis)</i> and <i>Shinkurt (Allium cepa)</i>	Take the dried skin of a hyena and put the herbs in a pouch of the leather as a charm around the neck	M6	"I used to suffer from evil eye in childhood. If that is prepared and is smelling in the house, someone who is suffering from evil eye will start shouting and moving around; they will tie him down by force and apply in his nose. If you apply this, he will tell you the person with the evil eye up to the seventh generation"	Anti-leishmanial, intestinal problems, bronchitis and other inflammatory disorders, cold and fever, anorexia, colic, infectious diseases (bacterial, protozoal), headache, amenorrhoea and dysmenorrhoea [39] Eye infection – topically [40] Haemostatic (nose), tonsillitis, cold, constipation, rheumatism [41] Whole herb is use for tonsillitis [42]
			Psychiatric disease (<i>lekeft</i>)		F1		
				Take Chikugn (<i>Artemisia abyssinica</i>) and three young leaves of <i>Set eret (Aloe pulcherrima)</i> with <i>Nech shinkurt (Allium sativum)</i> , <i>Tenadam (Ruta chaleensis)</i> , the whole plant of <i>Tekeze (Andrachne aspera)</i> , along with the leaves of <i>Chat (Catha edulis)</i> and <i>Ye ahya joro (Verbascum sinaiticum)</i> : chop together. The juice is applied to the nose	F2	"My father was told by somebody"	
			Fumigant for milk machinery		F1		
<i>Asparagus africanus</i> Lam.	Seriti	1928	Rituals such as circumcision, and giving birth Hung on the door where <i>Tella</i> (local beer) is being made, as protectant against uncleanliness (someone who is menstruating, or has recently had sexual relations)	Branch hung in the doorway	M1 M8 F1	Considered cleansing because "women are unclean just after giving birth"	Fresh pulverised root taken mixed with water to stimulate milk secretion. The use of the plant against gouty arthritis and as abortifacient have been recorded [43]

Table 3 Herb data chart (Continued)

<i>Brucea antidyserterica</i> J.F. Mill Simaroubaceae	<i>Fit aballo, aballo</i>	2013	Eczema (<i>chiffe</i>)	The leaves are collected and dried, the powder is then applied to the skin	F2	"I had this disease in childhood"	<i>Bullad</i> (weight loss, fever, itching, diarrhoea) [28] Evil eye (tied around neck) [30]
<i>Calpurnia aurea</i> (Aiton) Benth. Fabaceae	<i>Digitalis</i>	2008	Child with diarrhoea (<i>tekmet</i>)	The leaves of the young shoots from seven plants of <i>Digitalis</i> are rubbed in the hands for the juice; the juice is mixed with water Dosage is very important, depending on the age of the child	F3	"5 year old, 1 teaspoon, just once. This is what I had as a child". Some discussion about the toxicity of this plant	Decoction of the fresh leaf has been used against hypertension. Quinolizidine alkaloid, calpurnine, has been isolated [44] Diarrhoea [45] Amoebiasis, giardiasis [30] <i>Kuruba</i> (diarrhoea) [28] Used as a fish poison or as a cure for dysentery [46]
					M1	"The stem bark is poisonous. The dosage should be measured carefully. Only the young shoots are used. Even then one has to be very careful."	
					F1	"You can become crazy from it. If you go crazy, then you are going to die"	
<i>Capparis tomentosa</i> Lam. Capparaceae	<i>Gumero</i>		Psychiatric disease	In formula (see <i>Solanum incanum</i>)	F3		Bleeding after delivery [30]
<i>Catha edulis</i> (Vahl) Endl. Celastraceae	<i>Chat</i>		Psychiatric disease	In formula (see <i>Artemisia abyssinica</i>)	F2	Frequently observed sold in streets	Ephedrine has been isolated from this plant. Possesses psychostimulant properties [47]
<i>Chenopodium murale</i> L. Amaranthaceae	<i>Sinko</i>	1930	Unexplained stomach ache (<i>megagna</i>)	The young shoots are collected with scissors and rubbed through a sieve as used for the domesticated grass <i>Tef</i> (<i>Eragrostis tef</i>)	F4		

Table 3 Herb data chart (Continued)

<i>Cinnamomum verum</i> J. Presl	<i>Qorofa</i>	Taeniasis	In formula (see <i>Allium cepa</i>)	F1		
Lauraceae						
<i>Croton macrostachyus</i> Hochst. Ex.Delile	<i>Bisana</i>	2007	Skin rash	Mixed with egg yolk and applied to the skin	F1	Aphasia, ascariasis, constipation, eye disease, haemorrhoid, induction of abortion, purgative, ringworm, taeniasis, stomach ache, venereal disease control [12]
Euphorbiaceae			Skin rash	The fresh bud is cut and the fluid applied to the rash. If the problem is on the head, the head is shaved and bud fluid applied	M8	Scabies, <i>kuruba</i> (diarrhoea), hepatitis, <i>Tinea versicolour</i> [28]
			Dandruff			Malaria [30]
<i>Cymbopogon citratus</i> (DC.) Stapf	<i>Tej sar</i>	2004	Unexplained stomach ache (<i>megagna</i>)	Mixed with <i>Ariti</i> (<i>Artemisia absinthium</i>)	F5	Found at the marketplace as part of a fragrant bouquet Treatment of heart, chest and stomach complaints [48]
Poaceae						Stomach ache, smallpox, common cold [12]
						Ascariasis [30]
<i>Datura stramonium</i> L.	<i>Astenagir/Astenagirt</i>	1940	Hallucinogenic		M8, E	Eye disease ('crying eyes') (topical), bad breath (smoke inhaled, fungus infection of the head (topical), mumps (topical), relief of toothache (vapour inhaled), rheumatic pain (vapour inhaled), treatment of burn (topical), wound (topical) [12]
Solanaceae						Swelling (topical), toothache (inhalation), dandruff (topical) [49]
						Swelling, toothache, dandruff, wounds [28]

Table 3 Herb data chart (Continued)

<i>Echinops kebericho</i> Mesfin Asteraceae	Kerbericho	2001		To dispel nightmares in children	E	Found on sale in Fiche marketplace	Constipation, headache, heart pain, stomach ache, typhus [12]
<i>Embelia schimperi</i> Vatke Myrsinaceae	Enkoko	2032	Taeniasis	Chopped with <i>Musena</i> (<i>Albizia anthelmintica</i>) and <i>Nug</i> (<i>Guizotia abyssinica</i>) and eaten With <i>Musena</i> (<i>Albizia anthelmintica</i>) and <i>Nug</i> (<i>Guizotia abyssinica</i>), taken with a drink of <i>Tella</i> (local beer) With <i>Meterre</i> (<i>Glinus lotoides</i>) and <i>Kosso</i> (<i>Hagenia abyssinica</i>) The ripe fruits are collected and the exocarp removed. Fruit swallowed directly using water	M3 M1 M5 M7 M2 M1 M8 F2 M3	"Must be taken simultaneously with <i>Tella</i> . Drink, then jump up and down to dissolve internally. (M7)" If not taken with <i>Tella</i> , you will become dizzy and fall" (M5) " <i>Enkoko</i> and <i>Musena</i> are both deadly" "I remember my mother giving me this combination" "It is ok to take <i>Enkoko</i> , <i>Musena</i> and <i>Nug</i> together"	Powder of fruit mixed with water and taken as taenicide [52] Taeniasis, disinfectant [12] Taeniasis, ascariasis [48] Tapeworm [30]

Table 3 Herb data chart (Continued)

<i>Eucalyptus globulus</i> Labill. Myrtaceae	<i>Nech bahirzaf</i>	2027	Fever with headache (<i>mich</i>), colds	Apply rubbed leaves directly to nose	F5	Leaves are boiled with water and the vapour inhaled to treat cough, flu and sore throat [53]
<i>Euclea racemosa</i> L. Ebenaceae	<i>Dedaho</i>	2028	Warts of the rectum	The root is to be collected early in the morning before urination. The root is dug up then boiled, and a full small teacup of the filtrate must be drunk before food. After the medicine is drunk well prepared food is eaten and well prepared <i>Tella</i> (local beer) is drunk	M6	"Finally a kind of faeces will come out. If this does not happen initially, then the process is repeated the next day"
<i>Euphorbia tirucalli</i> L. Euphorbiaceae	<i>Qencheb</i>	2026	Scorpion bite	The skin around the bite is slashed, and the milky sap applied	M5	"The scorpion has a venom that gives gland pain for three days. After this application I was ok. Previously with a bite I suffered for three days. This time I was back at work in three hours. I had a small glandular response this time"
<i>Galium simense</i> Fresen. Rubiaceae	<i>Chogogit</i>	1998	Skin fungus (<i>qworqwor</i>)	The leaf is rubbed to get the juice which is applied to the affected place; the plant is then discarded. When applied, it irritates and causes a little bleeding. The next day it is washed off, and the patient has to wear newly washed clothing	E M1 M6 M8	"It will never come again" Extract of fresh leaves and inflorescences is used in Ethiopia to dress new wounds and cuts [56] Snake bite [13]

Table 3 Herb data chart (Continued)

<i>Glinus lotoides</i> L.	<i>Meterre</i>	2031	Taeniasis	Mixed with <i>Nug</i> (<i>Guizotia abyssinica</i>) and <i>Musena</i> (<i>Albizia anthelmintica</i>). Taken orally as a paste	F1, F5	Ascariasis, taeniasis, diabetes [12] Tapeworm – fruit powder mixed with <i>Nug</i> is taken orally [28]
<i>Molluginaceae</i>				Cleaned and ground with <i>Nug</i> (<i>Guizotia abyssinica</i>), added sugar and eaten before food. Fast until noon before taking it, then the first meal afterwards should be soup.	E	Found on sale in Fiche market
				<i>Meterre</i> with <i>Nug</i> OR <i>Musena</i> with <i>Nug</i>	M1, M7, M8	Remembers mother giving him all three
				<i>Meterre</i> , <i>Enkoko</i> (<i>Embelia schimperi</i>) and <i>Nug</i> (<i>Guizotia abyssinica</i>)	M8	
<i>Gomphocarpus purpurascens</i> A. Rich.	<i>Tefrindo</i>	2005	Rhesus Factor problem in pregnancy (<i>shotelay</i>), as part of formula (see <i>Achyranthes aspera</i>)		M3	
<i>Guizotia abyssinica</i> (L.f.) Cass.	<i>Nug</i>		Taeniasis	Used as a binder with many preparations, mentioned here for tapeworm infection	F1 M1 M2 M3 M5 M7 M8	Found on sale in Fiche market
<i>Asteraceae</i>						

Table 3 Herb data chart (Continued)

<i>Hagenia abyssinica</i> J.F. Gmel	Kosso	2025	Taeniasis	The flower taken with <i>Tenadam</i> (<i>Ruta chalepensis</i>), <i>Shunkurt</i> (<i>Allium cepa</i>), <i>Zingibil</i> (<i>Zingiber officinale</i>) and <i>Qorofa</i> (<i>Cinnamomum verum</i>)	F1	Female flowers are employed as a taenicide against <i>Taenia saginata</i> [57] Eye disease, hypertension, scabies, m[12] Provides a strong and widely used anthelmintic [46]
<i>Hordeum vulgare</i> L.	Gebts		Hypertension	Taken as a fermented barley drink. <i>Gebts</i> (germinated barley), <i>Mashilla</i> (<i>Sorghum spp.</i>) are baked together like a bread. This is broken up and fermented together with <i>beqil</i> (malt starter), brewed and distilled. Drunk from a shot glass	F1	Hordenine with diuretic and in large doses with hypertensive action has been isolated [58]
<i>Indigofera zavattarii</i> Chiov.	Quechine		Rhesus factor problem in pregnancy (<i>shotelay</i>)	In formula: see <i>Achyranthes aspera</i>	M3	
<i>Jasminum grandiflorum</i> L.	Tembelel	1957	Abdominal pain	The root is chewed	M1	
Oleaceae						
<i>Laggera tomentosa</i> (Sch. Bip.)	Shiro kese	1943	Unexplained stomach problems (<i>megagna</i>)	Leaves crushed and inhaled	PH	
Asteraceae						
<i>Laggera crispata</i> (Vahl) Hepper & J.R.I. Wood	Ras kebdo	1929	Dandruff (<i>forefore</i>)	Leaf rubbed and applied to the scalp	F5	
Asteraceae						

Table 3 Herb data chart (Continued)

<i>Leonotis ocymifolia</i> (Burm.f.) Iwarsson Lamiaceae	Feres zeng	1942	Headache (<i>ras metat</i>)	The collected leaves are rubbed between hands and put into nostrils to inhale OR The juice is squeezed out and drunk with coffee.	F6	"Particularly for headaches with tonsillitis. It cures it well. If not, the patient should be taken to the doctor. Go to a traditional medicine healer for headaches with tonsillitis"
			Ulcer of the neck (<i>nkersa</i>)	Chopped leaves are applied to the ulcer for 24 hours	M7	"People here assume it is cancer of the neck, but it is an ulcer. My uncle tried many things but finally he cured me with this"
			For sick chickens	With Aya joro (<i>Verbascum sinaiticum</i>)	F1	
<i>Lepidium sativum</i> L. Brassicaceae	Feto	2020	Unexplained stomach problems (<i>megagna</i>)	Ground, mixed with lemon juice and water	F5	Found on sale in Fiche market Skin problems, fever, eye diseases, amoebic dysentery, abortion and asthma, intestinal complaints [59]
						Aphrodisiac, gastritis, headache, ringworm, <i>buda beshita</i> (evil eye) <i>mich</i> (fever with headache) [12]
						Stomach ache [30]
<i>Leucas abyssinica</i> (Benth.) Briq.	Aychedamo	1941	Eye infection	E		For eye diseases, twigs of <i>Leucas abyssinica</i> are crushed and coated on eyes [60]
Lamiaceae						
<i>Linum usitatissimum</i> L. Linaceae	Talba		Demulcent	Option as protective against gastritis when used with <i>Allium sativum</i> in treatment for asthma	F2	Found on sale in Fiche market
<i>Lippia adoensis</i> Hochst. Ex Walp. Var. <i>Koseret</i> Sebesebe	Koseret	1931	Bee attractant		F1	Found on sale in Fiche market Dried leaves powdered together with barley eaten to get relief from stomach complaints [61]
Verbenaceae						
<i>Malva verticillata</i> L. Malvaceae	Lut	1935	Expulsion of placenta in cow	The root is dug up and chopped and given as a decoction to cow	F6	Malaria, fever, aphrodisiac [62]

Table 3 Herb data chart (Continued)

<i>Maytenus arbutifolia</i> (Hochst. Ex A. Rich.) R. Wilczek Celastraceae	Atat	2023	Psychiatric disease (in formula – see <i>Solanum incanum</i>)	F3	A number of <i>Maytenus</i> spp. Are used in traditional medicine to treat various disorders including tumors. A tumor inhibitor, maytansine, has been extracted [46]
<i>Myrsine africana</i> L. Primulaceae	Kechemo	2022	Taeniasis	F2	"If Kechemo does not work, go for one of the other ones – <i>Musena</i> (<i>Albizia anthelmintica</i>), <i>Enkoko</i> (<i>Embelia schimperi</i>), <i>Kosso</i> (<i>Hagenia abyssinica</i>)" Fruit powder paste with Nug seed is taken against tapeworm and ascariasis [63] Twigs used as a toothbrush [46]
<i>Nicotiana tabacum</i> L. Solanaceae	Tembaho	2029	Repels snakes from garden	F1, E	
<i>Ocimum lamiifolium</i> Hochst. Ex Benth. Lamiaceae	Demakese	1926	Fever with headache (<i>mich</i>) Influenza or cold Fever with headache	F5 OR OR F6	Demonstrated putting a <i>gabi</i> – heavy cotton shawl – over the head for inhalation of vapour The fresh leaves are squeezed and the juice sniffed to treat coughs and colds. The juice is also used as eye rinse to treat eye infections. The crushed leaves are put in the nostrils to stop nose bleeding [64] Cough, cold, headache, eye infection, hematuria, <i>mich</i> (fever with headache) [12] <i>Kusil</i> (wound), <i>mich</i> (fever) [28] <i>Mich</i> [29] <i>Mich</i> [4]

Table 3 Herb data chart (Continued)

<i>Opuntia ficus-indica</i> (L.) Mill.	<i>Culcal</i>		Haemorrhage in childbirth	In a formula (see <i>Periploca linearifolia</i>)	M3	
Cactaceae						
<i>Otostegia fruticosa</i> (Forssk.) Schweinf. ex Penzig	<i>Tinjut</i>	1932	Unexplained stomach ache (<i>megagna</i>)	F1	Found on sale in Fiche market	Insecticide, disinfectant, as a fumigant [12]
Lamiaceae						
<i>Periploca linearifolia</i> Quart.-Dill. & A.Rich.	<i>Tikur hareg</i>		Haemorrhage in childbirth	Combined in a formula with <i>Culcwal</i> (<i>Opuntia ficus-indica</i>) and <i>Qeret</i> (unidentified). All are chopped together and then the juice is collected separately (filtered), used as ink to write on paper as a charm hung around the neck	M3	"The <i>debtera</i> will write a charm with the filtrate and put it on her neck, and the blood will stop"
Apocynaceae			Prepared by <i>debtera</i> :	A potion is prepared, buried in the ground for a week. When opened, the inky fluid is used as an ink to write a spell, or charm. Alternatively, the ink is used to tattoo into the skin with a needle	M3	"The <i>debtera</i> will use this with other herbs to make a potion. This is put in a bottle and buried for seven days before September 11 (<i>Addis amet</i> – New Year's Day). When opened it will have an inky constituency. The <i>debtera</i> will then use a pen made from <i>Arundo</i> (bamboo), and will write on white paper. It is then worn on the neck. Another way is to tattoo the ink into the skin with a needle"
			To keep the wife from straying			
			To stop enemies from attacking			
			To prevent bullets from penetrating			
			To keep devils away			
			To stop pain			

Table 3 Herb data chart (Continued)

<i>Phytolacca dodecandra</i> L'Herit Phytolaccaceae	Endod	1927	Bilharzia Contraception	The whole roots of 7 young plants without branch, flower or fruit (sterile) are collected, being careful to get it all, on a Friday or a Monday. These are chopped and then mixed with honey, which is collected in October. The woman should take it at the end of menstruation	E F1 M1 M2 M3 M7 M8	Molluscide against Bilharzia [46] Ascariasis, eczema, gonorrhoea, infertility, liver disease, malaria, rabies, soap substitute, syphilis [12] Rabies [4]
			Skin blisters (<i>ekek</i>) – viral infection	The chopped fruit is mixed with water as a wash for the hands		

Table 3 Herb data chart (Continued)

<i>Podocarpus falcatus</i> (Thunb.) R.Br.ex Mirb. Podocarpaceae	Zegba	Hepatitis formula	Formula: Zegba Togor leaf (unidentified) Nechilo (unidentified) <i>Chifrig</i> (<i>Sida massoika</i>) <i>Yezingero addis</i> (unidentified) <i>Embwacho</i> (<i>Rumex nervosus</i>) <i>Serabizu</i> (<i>Thalictrum rhynchocarpum</i>) <i>Gesho</i> (<i>Rhamnus prinoides</i>) Topical application	M2	"My uncle took the leaf of Zegba and leaf of Togor and leaf of Nechilo. Then the root of Chifrig and the young shoot of Yezingero addis and then Embwacho and the whole plant of Serabizu and the young shoot of Gesho. All this was put together, chopped, added to water and stirred. This is applied to whole body of the child every morning for seven day, starting on a Wednesday or a Friday and it must be a cloudy day. But it must not be too cloudy"	Four species of <i>Podocarpus</i> including <i>Podocarpus falcatus</i> all exhibited strong inhibition against <i>Bacillus subtilis</i> , <i>Staphylococcus aureus</i> , <i>Escherichia coli</i> , <i>klebsiella pneumonia</i> and <i>Candida albicans</i> [65]
<i>Polygala hottentotta</i> C. Presl	<i>Etse adin</i>	1996	Anti-venom	F5		
Polygalaceae						
<i>Rhamnus prinoides</i> L'Herit	Gesho	1952	Hepatitis (in formula)		Found on sale in Fiche marketplace	
Rhamnaceae						
<i>Rhus retinorrhoea</i> Steud. Ex A.Rich.	<i>Tilum</i>	2009	Wounds	Rubbed in hands and then put on wound	M4	
Anacardiaceae						

Table 3 Herb data chart (Continued)

<i>Rumex abyssinicus</i> Jacq. Polygonaceae	Mekmeko	2012	Hypertension	F1	Gonorrhoea, lung TB, leprosy, fever [66]	
<i>Rumex nepalensis</i> Spreng. Polygonaceae	<i>Tult</i>	1936	Unexplained stomach ache (<i>megagna</i>)	The root is dug out and chewed. If <i>Tult</i> is not available, then the leaves of <i>Tenadom</i> (<i>Ruta chalepensis</i>) may be used instead	M2	Childhood memory of use. " <i>Tult</i> is very bitter. I was forced to chew it, I would be beaten if I did not chew it"
			Rhesus factor problem in pregnancy	Part of formula (see <i>Achyranthes aspera</i>)	M3	Amoebiasis, tonsillitis, uterine bleeding [12] Abdominal cramp, child diarrhoea, toothache, liver disease, eye infection [4] Stomach ache [13]
<i>Rumex nervosus</i> Vahl. Polygonaceae	<i>Embwacho</i>	2011	Eye problems	Leaves are collected, dried and pounded	F5	Remembers this from childhood
			Wound (<i>kusil</i>)			For dysentery, roots powder of <i>Rumex nervosus</i> mixed with melted butter. Stomach ache, roots in a honey paste dressing. Warts (<i>kintarot</i>), roots powder on cut edge [49]
			Hepatitis	In formula (see <i>Podocarpus falcatus</i>)	M2	
			Roundworm	Stem chopped with salt	M1	'My father collected <i>embwacho</i> and he kept a stem and chopped it in small pieces, added salt, gave it to me and forbade me from eating for one hour. After three days there was expulsion of worms and no problem since then'

Table 3 Herb data chart (Continued)

<i>Ruta chaleensis</i> L. Rutaceae	Tenadam	1997	Unexplained stomach ache (megagna)	In formula (see <i>Artemisia absinthium</i>)	M3	"The pain immediately disappeared"	Snakebites, headaches, abdominal pain, strained eye, head lice, fever, poor blood circulation, local paralysis, nervous tension, cough, asthma, infected wound, rheumatism. An infusion is also used as a tea to treat headaches, cold, heart pain, earache and intestinal disorder. Dried fruits boiled with milk are used against diarrhoea, or with <i>Tella</i> (local beer) or "wet" (stew) against influenza [67]
				Chew the leaves	M2, M4	Use if <i>Tult</i> (<i>Rumex nepalensis</i>) not available	Stomach problems [68] Evil eye and 'flu' [28]
				Combine with <i>Dingetegna</i> (<i>Taverniera abyssinica</i>) and wood ash mixed with a little water	F1	Will cause to vomit	
			Colic in baby		M3	<i>Tenadam</i> and <i>Ariti</i> (<i>Artemisia absinthium</i>) have the same use for treating the stomach"	
					PH	Found on sale in Fiche marketplace	
<i>Sansevieria ehrenbergii</i> Schweinf. Ex Baker	Wonde cheret		Ear infections		F1		
Asparagaceae							
<i>Sida massaica</i> Vollesen Malvaceae	Chifrig	1956	Roundworm	The whole part is ground and made into an infusion, filtered and drunk	F5		
			Hepatitis	In formula (see <i>Podocarpus falcatus</i>)	M2		
<i>Solanum americanum</i> Miller Solanaceae	Y'ayit Awut	1937	Gonorrhoea	Leaves eaten as a vegetable. Root chopped, infused and drunk	E		
<i>Solanum anguivi</i> Lam. Solanaceae	Zerch embway	1938	Scabies		E		Lymphadenitis [4]
			Nosebleed	Root used to brush teeth, the nosebleed will stop	F5		
			Gonorrhoea	Root infusion	E		
<i>Solanum incanum</i> L.	Embway	2030	Psychiatric disease (<i>lekeft</i>) (in formula)	Young shoots (without branch), combined with:	F3		Stomach problem, snake bite, chest pain, tonsillitis, <i>mich</i> [68]

Table 3 Herb data chart (Continued)

Solanaceae		Nosebleed	Mrenz root (<i>Acokanthera schimperi</i>) Gumero root (<i>Capparis tomentosa</i>) Atat (<i>Maytenus arbutifolia</i>) All plants are combined and all the juice is applied through the left nostril. The combination may also be inhaled from smoke	M6	"A nun showed me"		
<i>Stephania abyssinica</i> (Quart.-Dill. & A.Rich.) Walp.	Y'ayit joro/Shinet	2002	Toothbrush	Teeth brushed with the root	M5	Rabies [29]	
Menispermaceae						Used in traditional medicine to treat various stomach disorders and syphilis [46]	
<i>Taverniera abyssinica</i> A. – <i>Dingetegna</i> Rich.	Serabizu	2003	Unexplained stomach ache (<i>megagna</i>)	Taken with <i>Tenadam</i> (<i>Ruta chaleensis</i>) and <i>Amed</i> (wood ash), mixed together with a little water and drunk	F1	"Will cause to vomit" "Sudden disease", headache, stomach ache [12]	
Fabaceae						Vomiting, dysentery [28]	
<i>Thalictrum rhynchocarpum</i> Dill. Quart.-Dill & A.Rich.			Rhesus factor problem in pregnancy (<i>shotelay</i>) as part of formula- see <i>Achyranthes aspera</i>	M3		Menorrhagia [12]	
Ranunculaceae			As part of hepatitis formula (see <i>Afrocarpus podocarpus</i>)	M2		Urinary tract infection [29]	
<i>Thymus schimperi</i> Ronniger	Tosigne	1955	Whooping cough	Boiled leaves, drunk as a tea	F4	Found on sale in Fiche marketplace	Used medicinally for headaches and coughs [69]
Lamiaceae			Hypertension	Boiled leaves, drunk as a tea	F5 F4 F5		
<i>Trigonella foenum-graecum</i> L.	Abish		Demulcent	Mixed with garlic in the treatment of asthma (see <i>Allium sativum</i>), to protect against gastritis which may be caused by strong application of <i>Allium sativum</i>	F2	Found on sale in Fiche marketplace	Used in treating skin and stomach disorders [46]
Fabaceae							

Table 3 Herb data chart (Continued)

<i>Verbascum sinaiticum</i> Benth.	<i>Ye ahiya joro</i>	2034	Sick chickens	Together with <i>Feres zeng</i> (<i>Leonotis ocymifolia</i>)	F1	
Scrophulariaceae			Psychiatric disease (<i>lekeft</i>)	In formula (see <i>Artemisia abyssinica</i>)	F2	
<i>Verbena officinalis</i> L. Verbenaceae	<i>Aqwarach/</i> <i>Attuch/</i> <i>Telenz/</i> <i>Hulegeb</i>	1950	Tonsillitis	Chewed	F5	"My mother would chew it, and she has to take 2 birr* for this. Unless they take the money they cannot be cured. If you refuse, it does not work"
						* <i>Birr</i> is the unit of currency in Ethiopia
						Leaf and/or root juice taken against diarrhoea. Decoction of leaf employed as gargle for tongue disease, sore throat and toothache [70]
						Dysentery, digestive after eating raw meat, eczema, eye disease, heart disease, heart pain, indigestion, induction of diarrhoea and emesis to relieve indigestion, insomnia, liver disease, malaria, mumps, snake/rabid dog bite, sore throat, stomach ache, stomach trouble, tongue disease, tonsillitis [12]
						Stomach disorder, Herpes zoster, ear problems, evil eye, snake bite, ascariasis [28]
<i>Withania somnifera</i> (L.) Dunal Solanaceae	<i>Gizawa</i>	2033	Unexplained stomach ache (<i>megagna</i>)	Root is peeled then used as a fumigant by burning it and inhaling the smoke	M4	"Gizawa is my favourite medication. Especially for the stomach. Use the root, peel it, then use it as a fumigant"
			Bad spirits (<i>Satan beshita</i>)	Adaptogen: whole system	F1	"Gizawa is an all-out treatment for the whole system"
			Evil eye (<i>buda</i>)		F1	"Gizawa is like salt, it can go with anything. For devil spirit, epilepsy, <i>buda</i> . Not for wounds or physical sickness."
					M8, PH	Old saying: "Why did your child die if you had <i>Gizawa</i> growing in your garden?"
						Narcotic properties. Decoctions are used as pain killers [46]
						Main actions: Adaptogen, antioxidant, antibacterial and antifungal, anti-inflammatory, chondroprotective, anticancer, anxiolytic and antidepressant [72]

Table 3 Herb data chart (Continued)

Zehneria scabra Sond. Cucurbitaceae	Hareg resa/Shahare	1954	Dandruff (forefore) Eye problem (possibly trachoma)	F2 The eyelid is peeled back and rubbed with the back of the leaf. The eyes should be covered and protected from the light until healed.	F1, M8 M8 "The women use it"	Amenorrhoea, intelligence boost, <i>mich</i> (fever with headache) [12] <i>Mich</i> (fever with headache), stomach ache, wart [49] Leprosy, wound dressing, measles, anthelmintic [73] <i>Mich</i> [28] Malaria [29]
Zingiber officinale Roscoe. Zingiberaceae	Zingibil		Taeniasis Unexplained stomach ache (<i>megagna</i>)	As part of formula with <i>Kosso</i> (see <i>Hagenia abyssinica</i>) As part of formula with <i>Ariti</i> (see <i>Artemisia absinthium</i>) and <i>Tenadam</i> (see <i>Ruta chalepensis</i>)	F1 M3	Widely used as a medicinal plant worldwide

Code: M = Male; F = Female; PH = Professional herbalist; E = Ethnobotanist.

use of herbs for specific diseases was in the discussion of herbs for taeniasis and the discussion of the use of *Calpurnia aurea* for childhood diarrhoea (see Safety).

How herbal knowledge was acquired

All of the informants (15) described memories of being treated with herbs for illness as a child. All said they subsequently continued to learn, either from parents or knowledgeable elders, or both (see Table 4)

The two males who had learnt from both parents said that they had learned more from their fathers. One male who learnt only from his mother said that his father had died when he was young. The professional herbalist had learned from both his grandfather (a priest) and his mother.

Awareness of loss of herbs

There was recognition that some herbs are becoming less accessible, in part due to land degradation and accessibility. When the professional herbalist raised this issue during focus group 2, there was agreement from all present (6 men and 3 women). Examples of comments are:

"In the old days herbs were everywhere around the house and in the backyard because people planted them, and also they were growing naturally (referring to the observation in the past that herbs were tolerated or encouraged to grow around human habitation). Now I have to travel for two days to find some herbs. Even in the forest areas, some don't exist any more at all...Now everyone is looking for herbs, but no-one plants and looks after them" (PH)

"There is degradation of land, deforestation. Marginally the herbs are still available" (F4)

"Initially the Set eret (Aloe pulcherrima) was found close by, but now it is difficult to find this plant, it is only in inaccessible areas now" (M6)

Conservation of herbs

Informants demonstrated an understanding of conservation practices in their wildcrafting of the herbs. When *Aloe pulcherrima* plants were dug up during a field-walk/discussion session (W4), the underground stems

were planted for future growth, and an informant helping with collection and identification said:

"We don't want to take the whole plant because we use that to keep it growing here" (M5)

In a focus group session (FG1), conservative practices were referred to by the professional herbalist:

"Some use six herbs for this [formula]. This means more uprooting of plants. I will use only three herbs for this, that means fewer plants used" (PH)

Passing on knowledge

Following a discussion as to whether the younger generation is less likely to be interested in learning about herbal medicine, some informants underscored this issue with their own family experience:

"Of my 29 children, four (male priests) have been taught. Two of the children of the priests are interested, two are not" (PH)

"I have five children. If they are interested, I will pass it on" (M3)

Community awareness of the threat to the future of traditional herbal medicine has been noted elsewhere in Ethiopia [14].

It has been stated that the younger generation in Ethiopia is increasingly losing interest in learning about the herbs [13,29]. However three children (boys between seven and ten years of age) who joined the field-walk/discussion activities offered some information about the herbs they saw. A nine-year-old boy who worked as a shepherd at the site of a field-walk/discussion excursion, demonstrated in-depth knowledge including recognition and use of medicinal herbs. He was the son of an informant considered a skilled herbalist. The fact that these boys were children of informants, who were knowledgeable about the herbs and used them medicinally, meant that they were more likely to have been exposed to herbal lore in the family setting.

With the possible exception of some herbal medicine education included in religious instruction (there are some known ancient texts held by the Church), due to

Table 4 How herbal knowledge was acquired

Informant	Exposed to treatment as child	Learnt from both parents	Learnt only from mother	Learnt only from father	Learnt from others*
Female	6	3		2	1
Male	9	2	2	2	4
TOTAL	15	5	2	4	5

*Others learnt from include "relatives", "grandmother", "nun", "people around the church".

illiteracy or lack of time, recipes or formulae for herbal treatments continue to be taught to family members solely by demonstration and practical use in the oral tradition of their antecedents.

There is a frequently stated understanding that secrecy is an obstacle to the sharing of knowledge, particularly in the domain of the predominantly male professional herbalists [4,68,74]. In contrast to this, and perhaps reflecting increased awareness of the potential for loss, the professional herbalist at Fiche was keen to be involved and fully supported the Botanica Ethiopia objectives of establishing herbal gardens (Additional file 2), contributing and encouraging discussion and collaboration. When the purpose of the research was explained, he said:

"Teruneew. (It is good). This must happen. What we are doing is important for the herbs"

Another professional herbalist in the area later supported this statement during a spontaneous conversation. The fact that both herbalists were supportive of the establishment of a community "healing herbs" Association as part of the Botanica Ethiopia initiative, with one of the herbalists becoming Deputy Chairperson of the Association, firmly demonstrated willingness to participate in sharing knowledge.

Safety

All participants showed awareness of safety issues and dosage importance.

The importance of safety was discussed in relation to dosages of herbs used for contraception, for children, and with herbs known to have strong activity against taeniasis (tapeworm infection). A focus group debate (FG3) centred on the use of the herb *Phytolacca dodecandra* (*Endod*) for contraceptive purposes.

"I gave this to my wife and she never fell pregnant again. Once you take it you are sterile for life" (M5)

"If you spray poison on a flower, it will die" (F1)

Discussions of herbs used for taeniasis showed consensus in the use of certain herbs (FG1, FG2 and FG3), but debate arose around safety in combining the herbs (FG2). Taeniasis is an epidemic infection in Ethiopia, largely due to the custom of eating raw meat [75]. The discussions focused on four herbs: *Glinus lotoides* (*Meterre*), *Embelia schimperi* (*Enkoko*), *Albizia anthelmintica* (*Musena*) and *Hagenia abyssinica* (*Kosso*) with *Guizotia abyssinica* (*Nug*) used as a binder to make a paste with the other herb(s). Informants were concerned about the potential for these herbs to cause toxicity and debated the merits of combining what they described as potent herbs. Each of the

informants agreed that the four herbs mentioned were important, but there was disagreement as to whether they should be combined (considered dangerous by some) or used separately, and there were varying opinions on how the herbs should be taken. Table 5 summarises this discussion.

In this context, it is interesting to look at whether there has been exploration of the use of these herbs for taeniasis elsewhere. Animal and *in vitro* studies have been conducted on *Glinus lotoides*, *Embelia schimperi*, *Albizia anthelmintica* and *Hagenia abyssinica*. In 2006 a paper demonstrating the safety of *Glinus lotoides* as a taenocidal herb was published [76] but a subsequent investigation showed potential for genotoxicity in mice [77]. There have been investigations into the toxicity and therapeutic activity of a number of herbs traditionally used for taeniasis, including the herbs mentioned by the group in Fiche: *Albizia anthelmintica*, *Embelia schimperi*, *Glinus lotoides*, *Hagenia abyssinica* and *Myrsine africana* [75,78-80]. One of these studies reported *Myrsine africana* to have 'lethal action against tapeworm' [79]. The repeated mention by the informants of this group of herbs in the context of treatment of tapeworm infection contributes to existing documentation of their traditional usage in Ethiopia [3,17,30,75,77] and warrants further pharmacological investigation for their medicinal value.

Another example of a discussion of herbal safety occurred in a focus group (FG3) and concerned the use of *Calpurnia aurea* (*Digita*) for the treatment of childhood diarrhoea. The dosage, strength and potential toxicity of this herb were discussed.

"Take the young shoots from seven plants of Digita, rub the leaves in the hands for juice, for children with diarrhoea (tekmat). Put juice into water depending on the age of the child, dosage is very important. It is very strong. Very small by spoon. One teaspoon. Just once" (F3)

"It can be very dangerous. They [informants] say the stem bark is poisonous. Only the young shoots are used and even then one has to be very careful" (M8, also translating)

"Actually it can send you crazy. If you go crazy, you will die" (F1)

"It should be measured carefully" (F2)

The use of *Calpurnia aurea*, a quinolizidine alkaloid-containing member of the family Fabaceae, for the treatment of diarrhoea and a range of other conditions, is well documented from Ethiopia and other parts of Africa

Table 5 Discussion of herbs for taeniasis

Informant	Local names and discussion	Botanical names
(M) = Male		
(F) = Female		
F1, F4, F5	Meterre with Nug OR Musena with Nug The oil-containing Nug seed is ground to a paste and used to mix with the herbs for oral administration	<i>Glinus lotoides</i> + <i>Guizotia abyssinica</i> OR <i>Albizia anthelmintica</i> + <i>Guizotia abyssinica</i>
F2	First preference is Kechemo If this does not work, then one of the following a) Enkoko. Collect the ripe fruits, remove the outside and swallow the fruit directly using water OR b) Musena, the inflorescence, with Nug OR c) Kosso, the inflorescence with Nug	<i>Myrsine africana</i> <i>Embelia schimperi</i> <i>Albizia anthelmintica</i> + <i>Guizotia abyssinica</i> <i>Hagenia abyssinica</i> + <i>Guizotia abyssinica</i>
F1	Kosso with Tenadarm, onion, ginger and cinnamon made into Arake (spirit brewed with fermented grains)	<i>Hagenia abyssinica</i> + <i>Ruta chalepensis</i>
M3, M1	Enkoko and Musena, with Nug, combined	<i>Embelia schimperi</i> + <i>Albizia anthelmintica</i> + <i>Guizotia abyssinica</i>
M1, M5, M7, M2	Enkoko, Musena and Nug – to be taken with Tella (a traditional drink made from grains), or there will be a reaction	<i>Embelia schimperi</i> + <i>Albizia anthelmintica</i> + <i>Guizotia abyssinica</i>
M1, M7, M8	"Taking Musena and Enkoko together can be dangerous"	<i>Albizia anthelmintica</i> + <i>Embelia schimperi</i>

[28,45]. It has demonstrated anti-diarrhoeal effect in mice and *in vitro* inhibitory activity against a range of diarrhoea-causing bacteria [45].

Gender

The literature frequently discusses the Ethiopian tradition of preferentially passing on knowledge in the male line, either through the Church tradition or within the family [3,12,17,81] and studies tend to show that men have better medicinal plant knowledge [4]. However in focus group 1 (5 men and 1 woman), when one of the men declared that women hold more knowledge, all agreed that women have more herbal knowledge than men relating to the use of medicinal plants in the home.

"In the countryside, the women hold all the knowledge...the women had to learn the hard way, because men could be away at war or simply not there, so the women left behind have to take care of themselves and their children" (M1, with agreement from PH, M3, M4, M8, F1)

"More women know about the application of the herbs" (PH)

This concurs with the findings of Fassil in her 2005 study of home-based medicinal plant use in rural communities

in the Bahir Dar Zurie Wereda (district) in northwest Ethiopia [9], which showed that women have particular roles in traditional health care delivery in their capacities as mothers and cultivators of home gardens, and also the 2003 study by Gedif and Hahn [17] which recruited mothers as informants.

Group discussions were not so effective at capturing the information of the women as they were often pressed for time and unable to be present for as long as the men. Even during interviews the women were busy with children or food preparation. This limitation was also noted by Fassil [9].

Herbs: identification and usage

Both men and women on the field-walk/discussion activities demonstrated ability to identify medicinal herbs. At the Saturday market, women were the vendors of the herbs and were knowledgeable about their uses. The Saturday market was attended by members of the Fiche community and surrounding towns, with a variety of stalls managed by men, women and children selling foodstuffs (including culinary herbs), household equipment, and medicinal herbs. From a survey taken at the Saturday market, 15 medicinal herbs were identified (Table 6).

Conclusion

This study has shown that herbal medicine continues to be of great importance to this community in Ethiopia as

Table 6 Market Survey Herbs identified and information collected from vendors of medicinal plants

Botanical name	Amharic name	Use	Comment
<i>Artemisia absinthium</i>	Ariti	Stomach ache	Observed in a fragrant bouquet with Tej sar (<i>Cymbopogon citratus</i>) and Ajuban (<i>Ocimum basilicum</i> var. <i>thyrsiflorum</i>)
<i>Echinops kebericho</i>	Kebericho	Used as incense in the home for children who have nightmares Prevents nocturia Repels snakes from house	Smoke may be inhaled by covering head with blanket over the smoking root
<i>Glinus lotoides</i>	Meterre	Taenicial	Cleaned, ground with Nug (<i>Guizotia abyssinica</i>). Taken with a little sugar and eaten before food. Necessary to fast until noon prior to administering 1 birr for a small cup
<i>Guizotia abyssinica</i>	Nug	Ground seed used as binder	Seed is ground to a paste and mixed with herbs for administering
<i>Lepidium sativum</i>	Feto	Abdominal pain	Chopped, infused and drunk
<i>Lippia adoensis</i> var. koseret	Koseret	Culinary – used in making <i>niter kibbe</i> (a type of ghee)	
<i>Nigella sativa</i>	Tikurazmud	Culinary	
<i>Ocimum basilicum</i> var. <i>thyrsiflorum</i>	Ajuban	Fragrant bouquet Culinary flavouring/spice	
<i>Olea europaea</i>	Weyra	Sterilising treatment for milk equipment	Oil collected from root
<i>Otostegia fruticosa</i>	Tenjut	For stomach pain The branch is used for cleaning teeth	The leaves are burnt and smoke inhaled
<i>Rhamnus prioides</i>	Gesho	To make <i>Tella</i> (fermented drink)	
<i>Rosmarinus officinalis</i>	Asmarino, Yetibs ketel	Culinary flavouring, hair rinse	
<i>Ruta chalepensis</i>	Tenadam	Megagna (stomach pain)	Used in coffee
<i>Thymus schimperi</i>	Tosign	Hypertension	
<i>Trigonella foenum-graecum</i>	Abish	Digestive and culinary, skin disorders	

part of their healthcare system, and they are aware that the knowledge and the herbs are at risk of disappearing. Knowledge continues to be passed on via the oral tradition and by application. This community is motivated to help to increase awareness of, and accessibility to, the herbs they use to treat illness in the family home.

There were several important aspects noted during this study that future researchers in the area may wish to consider. One recommendation arising from our experience is that women be released from domestic duties for the purpose of interviews and focus groups. This would allow them to contribute their knowledge and experience more fully.

It may fairly be argued that conducting a study where the principal researcher does not share language or cultural background could present significant obstacles, but there were unexpected advantages that arose from this. The researcher's presence demonstrated to the informants an external awareness of, and respect for, the knowledge held by the community, and for their predicament. The fact that the research supported the implementation of

a project to establish a medicinal herb garden in the community also contributed to the willingness of the informants to contribute and share their knowledge. Collaboration with Ethiopian authorities (AAU and EIB) was essential for the successful conduct of the research. It was also important and helpful to consult with local authorities. Local government (*Kebelle*) and City Council representatives provided administrative support for the formation of the Etse-Fewus (Healing Plants) Association subsequent to the fieldwork, and local government subsequently donated land for a community medicinal garden, giving demonstrable government legitimacy to the initiative.

We recognise that all these elements were critically important for the successful conduct of the research and future researchers are encouraged to investigate how they may best support the communities with which they work. In doing so, they will contribute in part to the United Nations Millennium Development Goals [36], primarily those related to reduction of child mortality, improvement of maternal health, combating HIV/AIDS,

malaria and other diseases, promoting gender equality and empowering women, and ensuring environmental sustainability.

If Ethiopians lose their traditional herbal medicine - either the knowledge, or the plants or both - they will lose the ability to provide herbal treatment for their families. If they are also unable to access conventional medicine either through lack of affordability or availability, as is still the case in many rural areas particularly, they would be in an unenviable situation. Ethnobotanical, ethnomedical and anthropological research must continue in Ethiopia in order to understand the cultural, sociological and practical considerations that inform the wider community at institutional and governmental level. In the future, Ethiopians should be able to take advantage of opportunities to develop the potential of their rich medicinal plant resources via documentation of knowledge of use and pharmacological investigation of medicinal properties of the plants. Integration of traditional herbal medicine with outreach medical services may be a beneficial outcome of supporting further investigations in Ethiopia's medicinal herb lore.

Additional files

Additional file 1: Film footage.

Additional file 2: Botanica Ethiopia project description.

Abbreviations

AAU: Addis Ababa University; EIB: Ethiopian Institute of Biodiversity; SCU: Southern Cross University.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Ed'A conceived of the study, carried out the fieldwork and drafted the manuscript. HW supervised the research and contributed to the manuscript. ZA helped with internal in-country support and guidance, providing links within AAU and with EIB and arranging collaboration with AAU, and discussing the scientific issues, giving guidance throughout. TA assisted with translation during data collection, and collected and prepared voucher specimens that were lodged at EIB herbarium. All authors read, enriched and approved the final manuscript.

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Acknowledgements

Deep appreciation goes to the resourceful and skilled members of the Fiche Community, who subsequently became the "Etse-Fewus (Healing Herbs) Association", for their generous sharing of knowledge. Appreciation is given to Blackmores Ltd. for funding the postgraduate study of the principal researcher, and for financial support towards the Botanica Ethiopia project. Particular thanks go to Mr. Lakew Gebayehu, who provided links with the community and assisted in the research process and garden project; and to the Fiche Local Government and City Government for their support to the community subsequent to the research. Gratitude goes to Mr. Kebu Balemie of the Ethiopian Institute of Biodiversity for facilitating collaboration with EIB, and to Dr. Dawit Abate, Dean of the former Faculty of Life Sciences of AAU for supporting the collaboration with the Department of Plant Biology and Biodiversity Management. Thanks also to Professor Ensermu Kelbessa of AAU for his support, and to Abiyu Enyew for his knowledgeable assistance and enthusiasm for the research and project.

Financial support

Blackmores Ltd. and the Blackmore Foundation provided start-up funding for the Botanica Ethiopia project, and thus supported this research. Blackmores also provided an educational grant to Ed'A. Additional funding was obtained from the Australian African Children's Aid Support Association (AACASA) and individual donations. Donors had no involvement in the study design and execution, data analysis and interpretation, or the preparation of the manuscript.

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Received: 3 November 2013 Accepted: 28 February 2014

Published: 6 May 2014

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doi:10.1186/1746-4269-10-38

Cite this article as: d'Avigdor et al.: The current status of knowledge of herbal medicine and medicinal plants in Fiche, Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 2014 10:38.

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